

(12) UK Patent Application (19) GB (11) 2 204 376 A (13)

(43) Application published 9 Nov 1988

(21) Application No 8809267

(22) Date of filing 20 Apr 1988

(30) Priority data

(31) 3715251

(32) 8 May 1987

(33) DE

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(51) INT CL<sup>4</sup>

F16L 11/04

(52) Domestic classification (Edition J):

F2P 1B7B 1B7D 1B7M C27

(56) Documents cited

GB 1348523

GB 1175005

GB 1135220

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GB 0920159

(58) Field of search

F2P

B2E

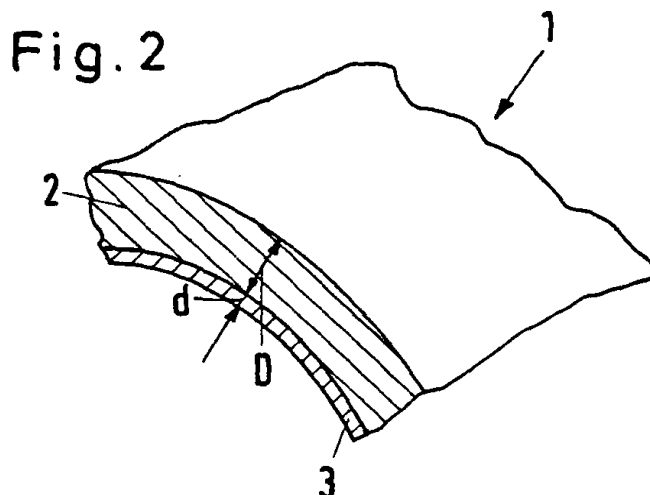
Selected US specifications from IPC sub-classes

F16L B05D B32B

(54) Motor vehicle pipeline

(57) A motor vehicle pipeline (1) particularly resistant to alcoholic medium, consists of polyamide pipe (2) with an internal seamless coating (3), thin compared with the pipe wall thickness, consisting of a polyolefine bonded to the polyamide pipe in the course of co-extrusion.

The thickness (D) of the pipe (2), which is preferably of polyamide 12, is 1.0 to 2.5 mm, while the thickness (d) of the coating (3), which has been exaggerated, is 0.1 to 0.2 mm, and the pipe material preferably contains a softener so that the combined pipe and coating can be handled like a hose.



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Fig.1

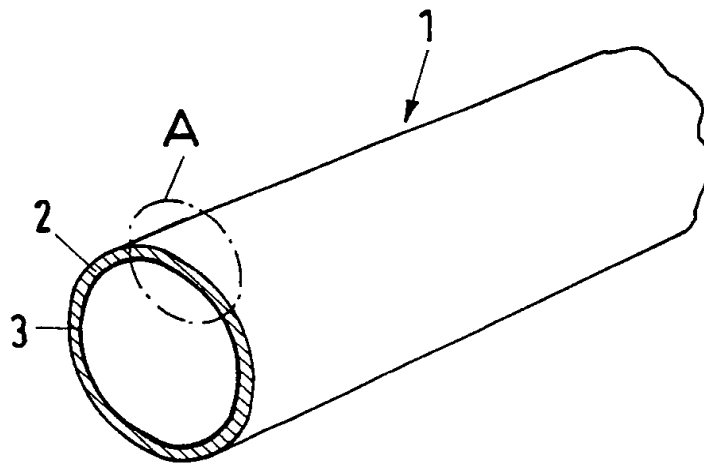
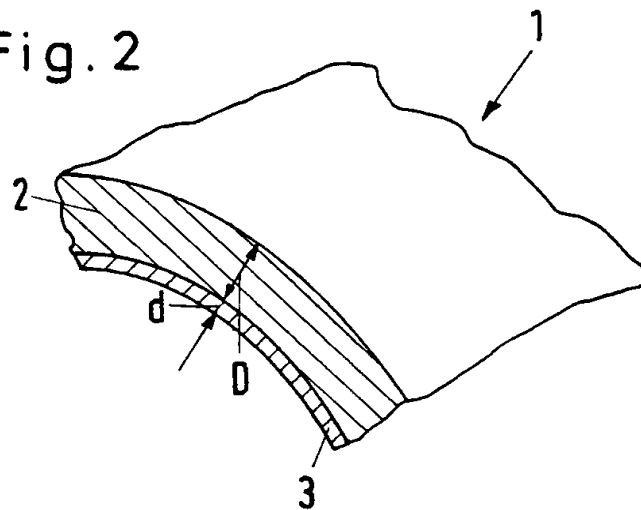


Fig. 2



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# MOTOR VEHICLE PIPELINE

This invention relates to a motor vehicle pipeline for carrying an alcoholic medium. Motor vehicle pipeline denotes the fact that the pipeline is installed in a motor vehicle at the time of manufacture. Alternatively, however, it can be installed subsequently in the course of servicing or repair. The term alcoholic medium primarily denotes a fuel with added alcohol or a fuel consisting basically of alcohol. However, the alcoholic medium and associated pipelines need not form part of the fuel system in the motor vehicle. Thus, the term alcoholic medium may for example denote the fluid for a screen-washing system or the pressure medium for a compressed air braking system. Alcohol is known to be added to compressed air braking systems to inhibit the freezing of condensate. In the context of the invention, alcohol more particularly denotes methyl alcohol, ethyl alcohol and/or mixtures thereof with water.

Known motor vehicle pipelines made from polyamide meet a certain set of requirements laid down by the motor vehicle industry. These are specified in DIN 73 376 and DIN 74 324, and have proved to be satisfactory, provided that the medium they carry contains no alcohol. However, in the presence of alcohol certain damaging effects are initiated: The polyamide swells and linear dimensions are increased by 5 to 10%. Moreover, the alcohol acts as an extracting agent on the polyamide; thus processing additives, stabilisers, monomers and softeners are extracted and dissolved in the alcoholic medium. Furthermore, this extraction alters the properties of the pipe. Moreover, polyamide has a low diffusion

resistance towards alcohol. In the case of a motor vehicle pipeline forming part of a braking system in which the braking medium contains alcohol as anti-freeze, this extraction gives rise to sporadic malfunctioning caused by swollen sealing components and sticky deposits on valve seatings. It is surmised in this connection that the alcohol extracts the softener from the polyamide pipes and the mixture of softener and alcohol then attacks the sealing components, and also that the softener is deposited as a sticky residue at other points, notably on valve seatings.

One could consider using other materials instead of polyamide for motor vehicle pipelines, such as alcohol-resisting synthetic materials. However, many of them fail to meet the set of requirements referred to previously, i.e., those laid down by the motor vehicle industry in respect of motor vehicle pipelines.

The object of the invention is to provide a motor vehicle pipeline which meets the set of requirements laid down by the motor vehicle industry, insofar as that it consists of polyamide, but which is also alcohol-resisting.

According to the present invention, a motor vehicle pipeline for carrying an alcoholic medium comprises at least one polyamide pipe and an internal seamless coating, thin compared with the pipe wall thickness, consisting of a polyolefine bonded to the polyamide pipe in the course of co-extrusion.

The polyamide pipe of the invention preferably has a wall thickness of 1 to 2.5mm, while the polyolefine coating has a wall thickness of 0.1 to 0.2mm. The outer diameter of

such motor vehicle pipe-lines is usually in the range 4 to 16 mm.

The invention makes use as heretofore of polyamide pipes dimensioned and adapted so as to meet the set of requirements laid down by the motor vehicle industry. However, in the course of co-extrusion the polyamide material is bonded to an internal polyolefine coating which, surprisingly, has no adverse effects on the properties of the polyamide pipe in relation to the aforesaid set of requirements, but which is alcohol-resisting and forms a sealing layer. The bonding achieved in the course of co-extrusion is so intimate that even extreme conditions are withstood.

The pipe preferably consists of a polyamide 6 or 6.6 and/or 11 or 12. The coating can consist of a polymeristate of propylene and maleic acid. Within the scope of the invention, at least the pipe material can include a softener, so that the assembly of polyamide pipe and polyolefine coating can be handled like a hose.

An embodiment of the invention will now be described, purely by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a portion of a motor vehicle pipeline in accordance with the invention; and

Figure 2 shows the part A of Figure 1 on a larger scale.

The pipe 1 shown in the drawings is intended to form part of a motor vehicle pipeline for carrying an alcoholic medium. The term alcoholic medium was discussed in the

introduction. The pipe 1 consists of polyamide and an internal seamless coating 3, thin compared with the thickness  $D$  of the pipe wall 2, consisting of a polyolefine bonded to the polyamide pipe 1 in the course of co-extrusion. The wall thickness  $D$  of the polyamide pipe 1 is 1.0 to 2.5mm, while the thickness  $d$  of the polyolefine coating 3, which in the drawing has been shown unduly thick so that it is recognisable, is 0.1 to 0.2mm. Most favourably, the wall thickness  $d$  of the coating is 0.1mm, and the material for the pipe is polyamide 12, which contains a softener so that the combined polyamide pipe and polyolefine coating can be handled like a hose.

# CLAIMS

1. A motor vehicle pipeline for carrying an alcoholic medium, comprising at least one polyamide pipe and an internal seamless coating, thin compared with the thickness of the pipe wall and consisting of a polyolefine bonded to the polyamide pipe in the course of co-extrusion.

2. A motor vehicle pipeline as in Claim 1, in which the polyamide pipe has a wall thickness of 1.0 to 2.5 mm, while the polyolefine coating has a wall thickness of 0.1 to 0.2 mm.

3. A motor vehicle pipeline as in either of Claims 1 and 2, in which the pipe consists of polyamide 6 or 6.6 and/or 11 or 12.

4. A motor vehicle pipeline as in any one of Claims 1 to 3, in which the coating consists of a polymeristate of propylene and maleic acid.

5. A motor vehicle pipeline as in any one of Claims 1 to 4, in which the pipe material includes a softener so that the combined polyamide pipe and polyolefine coating can be handled like a hose.

6. A motor vehicle pipeline substantially as hereinbefore described with reference to the accompanying drawings.